



Preface

This issue summarizes the various research outcomes obtained through the project known as “Asian Precipitation – Highly Resolved Observational Data Integration Towards Evaluation of Water Resources” (or “APHRODITE’s water resources” for short). Nowadays, most environmental and social development issues are linked with climate change, i.e., the global warming issue. Hence, high-resolution climate models are being developed and their outputs are being used to assess the impact of climate change on disaster risk, agricultural production and local hydrological resources. However, there has been no reliable observed dataset over Asia to verify climate model simulations and/or downscale their outputs to local hydrological application studies.

Hence we started the APHRODITE project in 1996. Using various connections of the members at the Research Institute for Humanity and Nature (RIHN) and Meteorological Research Institute (MRI) of the Japan Meteorological Agency (JMA), we negotiated with national meteorological and hydrological services (NMHS) of many countries to obtain their observed daily precipitation data. Finally, we got more than 10,000 station data figures over Asia as shown in Fig. 1. Then we reformatted the data, and applied a quality control (QC) scheme. We developed an interpolation algorithm to represent the orographic precipitation pattern more realistically. Details of the algorithm are described in Yatagai *et al.* (2009, 2012). I am happy to include a paper which described the QC scheme in this volume. It will provide suggestions to the user of the product as well as beginners at data processing.

The papers submitted to this volume appear by region, as shown in Fig. 1, since the orientation of the application studies differ from among regions. First, the product for Japan, APHRO_JP was released in 0.05 degree resolution

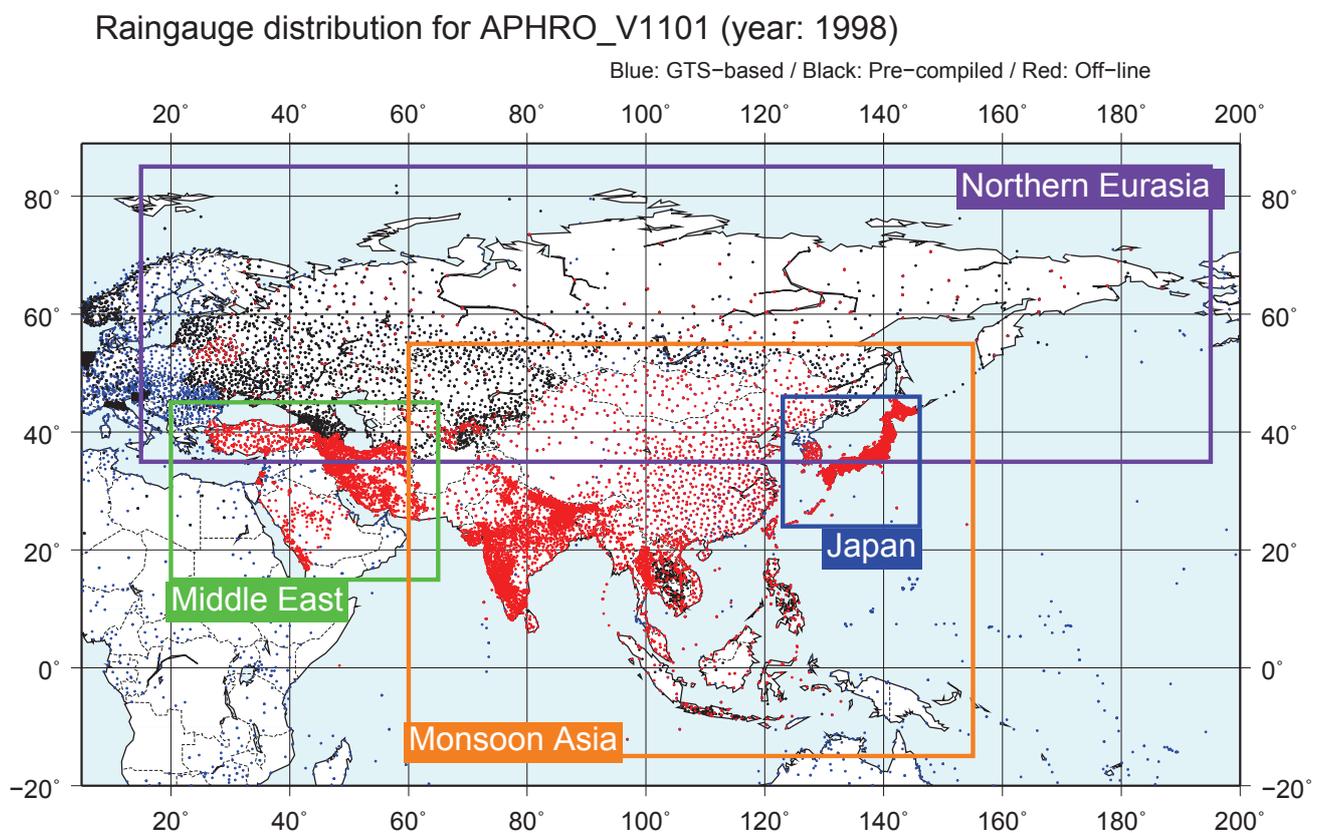


Fig. 1 The domains and rain-gauge distributions used in APHRODITE V1101 for Monsoon Asia, the Middle East and Russia, and in V1005 for Japan. Blue dots show stations derived from the GTS network, black dots, from the precompiled dataset; and red dots, from APHRODITE’s individual data collection.



(Kamiguchi *et al.*, 2010) and it has already been used in studies on extreme events in relation to the global warming issue. A paper written by a specialist on statistical downscaling for agricultural application is included.

South and Southeast Asia are regions where we see large differences in estimates of quantitative rainfall among the products. Hence, a comparison study among the products and a study for developing a new satellite-gauge-based algorithm are shown. In addition, hydrological and agricultural application studies are included in this volume.

In the Middle East – the APHRODITE project was initiated by a feasibility study to develop a rain-gauge-based product for the Middle East. I am convinced that a quantitative and high-spatial resolution product would be beneficial to understanding in paleo-climate studies by combining climate model simulations and proxy data. In this issue, we show how representative the Fertile Crescent is, using a high-resolution model and our precipitation estimates. In northern Eurasia, unlike Monsoon Asia, differences among the products are not that large. On the contrary, cold regions including the high-altitude region in Monsoon Asia and the Middle East do have an important issue with regard to global warming – namely, the existence of snow and ice. We developed a temperature dataset and added discrimination between snowfall and rainfall, including these in this paper together with their application in a run-off study.

On behalf of the project members, I express the sincere hope that our APHRODITE product will be used in many climate change studies. We anticipate feedback from the users.

Akiyo YATAGAI
Principal Investigator of the APHRODITE project

References

- Kamiguchi, K., O. Arakawa, A. Kitoh, A. Yatagai, A. Hamada and N. Yasutomi (2010) Development of APHRO_JP, the first Japanese high-resolution daily precipitation product for more than 100 years, *Hydrological Research Letters*, 4: 60-64.
- Yatagai, A., O. Arakawa and K. Kamiguchi, H. Kawamoto, M. I. Nodzu and A. Hamada (2009) A 44-year daily gridded precipitation dataset for Asia based on a dense network of rain gauges, *SOLA*, 5: 137-140, doi:10.2151/sola.2009-035.
- Yatagai, A., K. Kamiguchi, O. Arakawa, A. Hamada, N. Yasutomi and A. Kitoh (2012) APHRODITE: Constructing a Long-term Daily Gridded Precipitation Dataset for Asia based on a Dense Network of Rain Gauges, *Bulletin of American Meteorological Society* (in press).